Tabulated statement showing principal characteristics of areas of high and low pressure.

Barometer.	First observed.			Last observed.				Maximum pressure change and maximum abnormal temperature change in twelve hours and maximum wind velocity.								
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.	Duration.	Velocity per hour.	Station.	Rise.	Date.	Station.	Fall.	Date.	Station.	Direction.	Miles per hour.	Date.
High areas.		°	°	°	°	Days.	Miles.		Inch.			°					
I	1	44	71	35	85	3.0	16	Sydney, C. B. I	.26	1	Augusta, Ga	12	1	Kitty Hawk, N.C	ne.	36	1
II	2	44	125	35	98	5.0	22	Pueblo, Colo	.32	3	Concordia, Kans	29	2	Denver, Colo	n.	30	5
III	5	50	86	46	63	2.0	25	Sydney, C. B. I	.54	6	Montreal, Quebec	13	5	Kitty Hawk, N.C	ne.	30	6
IV	7	52	115	39	92	3.0	22	Medicine Hat, N. W. T	.30	7	Spokane Falls, Wash	17	7	Rapid City, S. Dak	nw.	36	7
V	9	53	105	45	68	3.0	25	Portland, Me	.40	11	Kingston, Ont	18	11	Port Huron, Mich	ne.	32	11
VI	11	43	124	44	62	7.0	26	Anticosti Island, G. St. L.	.40	17	Pueblo, Colo	19	12	Eureka, Cal	n.	34	11
VII	16	41	125	29	84	5.5	20	Calgary, N. W. T	.56	17	Winnemucca, Nev	22	15	Rio Grande City, Tex	n.	40	18
VIII	19	53	114	29	87	5.0	20	do	.42	19	Rapid City, S. Dak	20	20	Tatoosh Island, Wash	e.	40	20
XI	23	40	125	35	77	5.5	26	Cincinnati, Ohio	.46	27	Louisville, Ky	23	27	Chicago, Ill	ne.	46	27
X	28	37	126	51	105	3.0	24	Saint Vincent, Minn	.74	31	Miles City, Mont	21	30	Fort Canby, Wash	se.	30	30
Mean						4.2	23		.44			19				35	
Low areas.									Fall.			Rise.					
I	1	38	108	50	68	2.5	36	Quebec, Quebec	.30	2	Father Point, Quebec	16	3	Sioux City, Iowa	s.	46	2
II	4	44	83	43	66	1.5	25	Rockliffe, Ont	.28	4	Yarmouth, N. S	13	5	Cairo, Ill	nw.	26	4
III	8	42	70	48	54	1.0	38	Sydney, C. B. I	.68	8	Sydney, C. B. I	18	8	Kitty Hawk, N. C	n.	44	8
IV	10	52	116	47	65	6.0	18	Manistee, Mich	.34	13	Grand Haven, Mich	17	13	Huron, S. Dak	se.	60	11
V	14	51	114	49	64	7.0	23	Father Point, Quebec	.52	21	Roseburg, Oregon Valentine, Nebr	22 22	13 15	Fort Canby, Wash	s.	61	14
VI	19	53	106	49	88	1.5	33	Medicine Hat, N. W. T	.48	18	Helena, Mont	20	19	Saint Vincent, Minn	s.	36	19
VII	22	48	126	45	68	4.5	30	Sydney, C. B. I	.36	27	Huron, S. Dak	20	23	Fort Canby, Wash Winnemucca, Nev	s. s.	58 58	22 22
VIII	22	38	77	47	61	2.0	23	do	.66	23	Chattanooga, Tenn	24	21	Block Island, R. I do	n. n.	64 64	22 23
IX	26	47	125	53	106	1.0	39	Calgary, N. W. T	.60	26	Winnemucca, Nev	16	26	Fort Canby, Wash	s.	46	26
X	28	49	125	47	74	3.5	29	do	.40	28	Northfield, Vt	33	30	Detroit, Mich	nw.	61	31
Mean						3.0	29		.46			20				51	

NORTH ATLANTIC STORMS FOR OCTOBER, 1891 (pressure in inches and millimeters; wind-force by Beaufort scale).

The paths of storms that appeared over the west part of the north Atlantic Ocean during October, 1891, are shown on Chart I. These paths have been determined from observations by shipmasters received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

October usually marks the commencement of the stormy season in the middle latitudes of the north Atlantic Ocean. The north Atlantic area of high pressure contracts, the Iceland area of low pressure extends its limits southward, with a decrease in central pressure, and storms which advance from the west part of the north Atlantic or from the American continent have a comparatively unobstructed path to the middle and north coasts of Europe. Storms of tropical origin are not uncommon in October. West India cyclones of October generally appear over the Caribbean Sea and recurve over or near extreme western Cuba or the east part of the Gulf of Mexico. In the last 18 years 9 storms of marked energy have advanced northward from the Caribbean Sea in October.

The north Atlantic storms of the current month were exceptionally severe, more especially those of the first and second decades of the month. During the first decade a storm of tropical origin advanced from southeast of Bermuda and reached the Newfoundland coast the night of the 5th; cyclonic areas were noted over the east and west parts of the Gulf of Mexico; very heavy gales were encountered over mid-ocean; and unsettled and stormy weather prevailed over the British Isles. In the second decade two energetic storms of tropical origin traversed the western part of the ocean; exceptionally severe weather was encountered over mid-ocean during the first half of the decade; and destructive storms occurred over the British Isles. In the third decade a heavy storm passed along the middle Atlantic and New England coasts and thence over the Canadian Maritime Provinces. Over the middle and eastern parts of the ocean the weather was comparatively settled after the 20th.

On the 1st a storm of considerable energy was central northeast of the Windward Islands, whence it moved northwestward and the morning of the 4th was central west of Bermuda. During the 4th and 5th the path recurved to the north and northeast. The center of disturbance reached Nova Scotia the night of the 5th, and moving thence east-northeast apparently joined the Iceland area of low pressure by the 8th. This storm passed south of Bermuda the night of the 3d–4th, attended by heavy north-northeast to east and south gales, and pressure falling to 28.97 (736) at 8 p. m. of the 3d at Bermuda. Gales of force 10 to 11 attended the recurve of this storm to the northeast, and during the 7th and 8th, when central over mid-ocean, the pressure fell below 29.00 (737), and terrific gales were encountered along the trans-Atlantic steamship routes.

On the 1st a dispatch was received from Havana, Cuba, stating that a slight disturbance was seemingly developing to the southwest. During the next four days a cyclonic disturbance was indicated over the west part of the Gulf of Mexico. On the 6th a cyclonic area was apparently central south of western Cuba; by the 7th this storm had reached southern Florida, moving northeastward. Moving slowly northeastward off the Atlantic coast, the center reached Nova Scotia on the 14th, and moving thence east-northeast, was central south of Iceland on the 18th, and probably passed thence to the British Isles by the 21st. On the 11th, when central off Hatteras, this storm was apparently joined by a cyclonic area from the east part of the Gulf of Mexico. From the 11th to the 14th the passage of this storm was attended by the heaviest gales of the month along the middle Atlantic and New England coasts, and at points from the Carolinas to the southeast New England coast the maximum wind velocity exceeded 70 miles per hour, causing disasters to shipping and damage to property. The very high winds reported are a notable feature of this storm, inasmuch as the barometric depression was slight, the lowest reading being about 29.50 (749) the morning of the 14th. The barometric gradient was, however, very steep to the northward of the center during the 13th and 14th.

On the 5th and 6th the pressure fell below 29.00 (737) in a cyclonic area west of the British Isles, and on the 6th destructive gales prevailed over Ireland and along the west and south

coasts of Great Britain. The Bermuda storm above referred to apparently united with this low area by the 8th. Under the influence of the Iceland area of low pressure, which had apparently assumed a position more to the eastward than usual, and of areas of low pressure which advanced from the ocean, low pressure and stormy weather continued over the British Isles until the 23d. On the 13th and 14th immense damage was caused to coast and inland property in England, Ireland, and the south of Scotland, and gales of destructive violence continued during the 15th and 16th.

The presence of a cyclonic area over the east part of the Caribbean Sea was indicated by reports of the 13th to 15th. During the 15th the path apparently recurved northward over or near San Domingo, and the morning of the 17th the center was located east of the Bahamas, whence it moved north-northeast and reached the south coast of Newfoundland on the 20th. On the 17th gales of hurricane force were encountered east-northeast of the Bahamas. The night of the 17th a strong southeast gale set in at Bermuda. On the 18th, at 10 a. m., the barometer fell to 29.30 (744) at Bermuda, and during the day the wind was southeast to southwest and reached force 11, causing considerable damage. The storm-center passed west of Bermuda about 7 p. m. of the 18th. During the 19th there was an apparent decrease in energy, and during the 20th the path recurved westward and the storm united with low area V, which was moving down the Saint Lawrence Valley.

On the 25th low area VIII had advanced north of Newfoundland, and on the 28th low area VII had reached the east Newfoundland coast, whence it apparently moved eastward to mid-ocean by the close of the month.

FOG IN OCTOBER.

The limits of fog belts west of the 40th meridian, as determined from reports of shipmasters, are shown on Chart I by dotted shading. Near the Banks of Newfoundland fog was reported on 9 dates; and between the 55th and 65th meridians on 2 dates. No fog was reported by shipmasters west of the 65th meridian. Compared with the corresponding month of the last 4 years the dates of occurrence of fog near the Grand Banks numbered 5 less than the average, and between the 55th and 65th meridians 2 less than the average. West of the 65th meridian the average number of dates for which fog has been reported in October during the last 4 years is 3. Dense fog was reported at stations along the New England and New York coasts from the 3d to 5th. The fog reported west of the 40th meridian and at Weather Bureau stations on the New England and New York coasts attended the approach or passage of general storms.

OCEAN ICE IN OCTOBER.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for October during the last 9 years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
	° ′	° ′		° ′	° ′
October, 1883	46 56	46 22	October, 1883	46 56	46 22
October, 1884	Off Cape Race		October, 1884	46 56	50 55
October, 1885	48 21	47 12	October, 1885	48 21	47 12
October, 1886	41 34	49 43	October, 1886	46 03	46 37
October, 1887	42 58	50 02	October, 1887	42 58	50 02
October, 1888	51 43	55 36	October, 1888	51 43	55 36
October, 1889	44 32	49 28	October, 1889	46 30	45 59
October, 1890	44 47	49 33	October, 1890	47 56	45 45
October, 1891	48 04	48 27	October, 1891	48 04	48 27
Mean	46 09	49 56	Mean	47 16	48 33

The southernmost and eastermost ice reported was one iceberg, noted on the 3d in the position given in the table. This was the only date for which ice was reported south of the 50th parallel. Icebergs were reported in or east of the Straits of Belle Isle on the 5th, 6th, 11th, 12th, and 25th. The quantity of Arctic ice reported was notably deficient when compared with that observed for October during the last 9 years. The positions of icebergs reported for the current month are shown on Chart I by ruled shading.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

Many of the voluntary stations do not have standard thermometers or shelters.

The distribution of mean temperature over the United States and Canada for October, 1891, is exhibited on Chart II by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperature and the departure from the normal are given for regular stations of the Weather Bureau. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the average for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Weather Bureau represents the mean of the maximum and minimum temperatures.

The mean temperature was highest at stations in the Colorado Desert in the east part of San Diego county, Cal., where it was above 80, and the mean values were above 70 over the southern half of the Florida Peninsula, in extreme southern Louisiana, in the lower Rio Grande valley, and in adjoining parts of southeastern California and western Arizona. The mean temperature was lowest in the mountains of Colorado and over the greater part of Canada east of the 115th meridian, where it was below 40, and the mean readings were below 50 north of a line traced from the middle New England coast westward to the eastern slope of the Rocky Mountains, thence southward to central New Mexico, and thence irregularly northwestward to northeast Washington. The mean temperature was also below 50 at stations on the Central Pacific Railway crossing the summit of the Sierra Nevada Mountains in California.

DEPARTURES FROM NORMAL TEMPERATURE.

The mean temperature was generally above the normal on the Pacific coast, over the plateau and Rocky Mountain regions, and from the middle and upper Missouri valleys eastward over the west and north parts of the Lake region to the Saint Lawrence Valley. Along the Atlantic coast from Nova Scotia to Florida and thence westward to Kansas and Texas the mean temperature was below the normal.

The greatest departure above the normal temperature occurred at stations in the west part of the plateau region, on the north Pacific coast, and in northern California, where it was 2 to 4, and the most marked departure below the normal temperature was noted along the south Atlantic and east Gulf coasts, where it exceeded 4.

DEVIATIONS FROM NORMAL TEMPERATURE.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for October for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for October, 1891; (4) the departure of the current month from the normal;